



UNITED STATES PATENT AND TRADEMARK OFFICE

5K
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/881,670	06/18/2001	Ryuichi Matsuda	209667US-2	7193
22850	7590	02/03/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ALEJANDRO MULERO, LUZ L	
			ART UNIT	PAPER NUMBER
			1763	
DATE MAILED: 02/03/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/881,670	MATSUDA ET AL.	
	Examiner	Art Unit	
	Luz L. Alejandro	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3,4 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-4, 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/25/03 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3-4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al., U.S. Patent 6,288,493 in view of Holland et al., U.S. Patent 5,800,619.

Lee et al. shows the invention as claimed including a semiconductor manufacturing apparatus 10 comprising: a vessel 104 having an electromagnetic wave transparent window; a power supply antenna 100/100' provided outside the vessel and opposed to the electromagnetic wave transparent window; and a power source 102/102' for applying a high frequency voltage to the power supply antenna; and being adapted to apply the high frequency voltage from the power source to the power supply antenna to generate an electromagnetic wave, and pass the electromagnetic wave through the electromagnetic wave transparent window into the vessel to generate a plasma, thereby treating a surface of a substrate 106 in the vessel 104, wherein the power supply antenna comprises a plurality of coils 300a, 300b / 310a, 310b, 310c disposed concentrically, the plurality of coils being prepared by bending a plurality of conductors each into the form of an arc, and is configured such that power supply portions formed at opposite ends of the respective coils so as to be connected to the power source are located in different phases on a same plane (see figs. 1, 3A-3B, col. 1-line 43 to col. 2-line 2 and col. 3-line 34 to col. 4-line 67).

Lee et al. does not expressly disclose that at least one of the coils is disposed on a plane other than the same plane and is configured to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted. Holland et al. suggests positioning coils in many different planes above a dielectric window (see col. 14-lines

Art Unit: 1763

10-23) and varying the thicknesses of respective coils so as to vary mutual and self inductances (see col. 13-line 46 to col. 14-line 9). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Lee et al. so as to produce a coil structure as suggested by Holland et al. because this produces an apparatus with a plasma having a relatively uniform density (see col. 13-lines 46-51).

Lee et al. and Holland et al. are applied as above but do not expressly disclose where spacing between the adjacent power supply portions in the respective coils is equal. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine through routine experimentation the optimum spacing between the power supply portions in adjacent coils based upon a variety of factors, including reducing potential problems such as cross over of wires connecting different coils to the power supply that can lead to shorting, and such limitation would not lend patentability to the instant application absent the showing of unexpected results.

Claims 3-4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al., U.S. Patent 5,571,366 in view of Holland et al., U.S. Patent 5,800,619.

Ishii et al. shows the invention as claimed including a semiconductor manufacturing apparatus comprising: a vessel 110 having an electromagnetic wave transparent window 111; a power supply antenna 116,117 provided outside the vessel and opposed to the electromagnetic wave transparent window 111; and a power source

Art Unit: 1763

for applying a high frequency voltage to the power supply antenna 116,117; and being adapted to apply the high frequency voltage from the power source to the power supply antenna to generate an electromagnetic wave, and pass the electromagnetic wave through the electromagnetic wave transparent window into the vessel to generate a plasma, thereby treating a surface of a substrate W in the vessel 110, wherein the power supply antenna 116,117 comprises a plurality of coils disposed concentrically, the plurality of coils being prepared by bending a plurality of conductors each into the form of an arc, and is configured such that power supply portions formed at opposite ends of the respective coils so as to be connected to the power source are located in different phases on a same plane (see figs. 23-25 and col. 15-line 64 to col. 18-line 7).

Ishii et al. does not expressly disclose that at least one of the coils is disposed on a plane other than the same plane and is configured to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted. Holland et al. suggests positioning coils in many different planes above a dielectric window (see col. 14-lines 10-23) and varying the thicknesses of respective coils so as to vary mutual and self inductances (see col. 13-line 46 to col. 14-line 9). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Ishii et al. so as to produce a coil structure as suggested by Holland et al. because this produces an apparatus with a plasma having a relatively uniform density (see col. 13-lines 46-51).

Ishii et al. and Holland et al. are applied as above but do not expressly disclose where spacing between the adjacent power supply portions in the respective coils is

equal. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine through routine experimentation the optimum spacing between the power supply portions in adjacent coils based upon a variety of factors, including reducing potential problems such as cross over of wires connecting different coils to the power supply that can lead to shorting, and such limitation would not lend patentability to the instant application absent the showing of unexpected results.

Response to Arguments

Applicant's arguments filed 11/25/03 have been fully considered but they are not persuasive.

Applicant argues that both Ishii and Lee fail to expressly disclose placing the power supply portions in different phases in a same plane. However, the examiner respectfully submits that in both Ishii and Lee the power supply portions (the portions of the coil connected to the power supply) are formed in different phases in the same plane in the same way as shown by applicant in fig. 2 of the instant application.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a

Art Unit: 1763

reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that Holland does not expressly disclose that at least one of the coils is disposed on a plane other than the same plane in order to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

Art Unit: 1763

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 571-272-1439. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Luz L. Alejandro
Primary Examiner
Art Unit 1763

January 29, 2004